NEVADA CLIMATE SUMMARY

[2004] July/August Summary
Volume 21, Numbers 7 & 8

GREETINGS FROM THE NEW STATE CLIMATOLOGIST

I would like to take this opportunity to formally introduce myself to the climate observers and the climate/meteorology community in Nevada. I am Jeffrey Underwood, the new Nevada State Climatologist. As you may have read in the June *Climate Summary* I received my Ph.D. from the University of Georgia, and my undergraduate degree was completed at Virginia Tech. My professional appointments include a two-year stay at California State University, Fresno, and three years at Southern Illinois University. My current title includes both Nevada State Climatologist and assistant professor of Geography at the University of Nevada, Reno.

My research interests revolve around mountain/valley processes. Most recently I have published articles investigating the relationship between cloud-to-ground lightning flashes and heavy precipitation/flash flooding in mountain drainage basins recently burned by wildfire. I am also actively engaged in research to detect and analyze radiation fog using satellite imagery. Additionally, I have an active interest in winter season frozen precipitation.

PLANS FOR THE NEVADA CLIMATE OFFICE

The following is an outline for the future direction of the Nevada Climate Office. First I would like to acknowledge that the office would not exist but for the effort of the recently retired State Climatologist John James. Any new endeavors that may be undertaken with my appointment would not be possible without John James and his commitment to this office.

First of all the Nevada Climate Office will continue its core mission of maintaining descriptions and information on the climate in the state (NRS 396.595). This mission requires the continued cooperation of the observer network that currently stands at 46 individuals across the state of Nevada. The observer network is of great importance and, as the new State Climatologist; my goal is to visit with each observer during the next nine months.

The operations of the State Climate Office will expand in the area of data provision. The primary media for distributing data to users of the Office will be the world wide web (www). The Climate Office website is under development and will be available to users by October 15. One of the data sets to be made available on the website is the B-91 information now archived in hard copy. The office staff is currently converting the B-91 data into digital format compatible with data available through the Western Region Climate Center. This data will be available free of charge to users of the State Climate Office. The data conversion is scheduled for completion by fall of 2005.

The Nevada State Climate Office will also begin to expand its research mission. This mission is designed to enhance the office's ability to serve the public by providing analysis of climate and weather issues of importance to the residents of Nevada. Initially, two broad topics will drive the research effort: 1) Drought and drought impacts in Nevada, 2) Climate and human health in Nevada.

Other areas of research promoted by the office include: 1) Lightning and rainfall studies; 2) Dust

storm climatologies; 3) Snowfall and other frozen precipitation studies.

JULY CONDITIONS

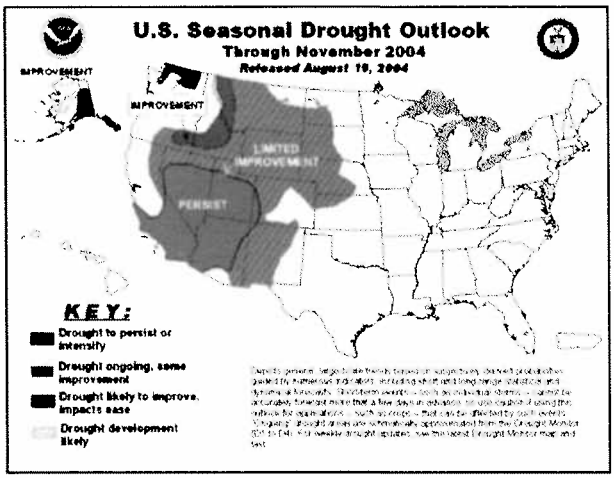
A persistent high-pressure ridge in the 500hPa flow dominated July conditions across northwest Nevada. This ridge produced clear skies, which allowed daytime temperatures to exceed the normal by more than three degrees. Additionally, nighttime low temperatures were much warmer than normal. The National Weather Service Forecast Office in Reno reported a monthly average temperature 6.6°F warmer than normal. Fernley's high temperature on both July 23 and July 24 was 105°F.

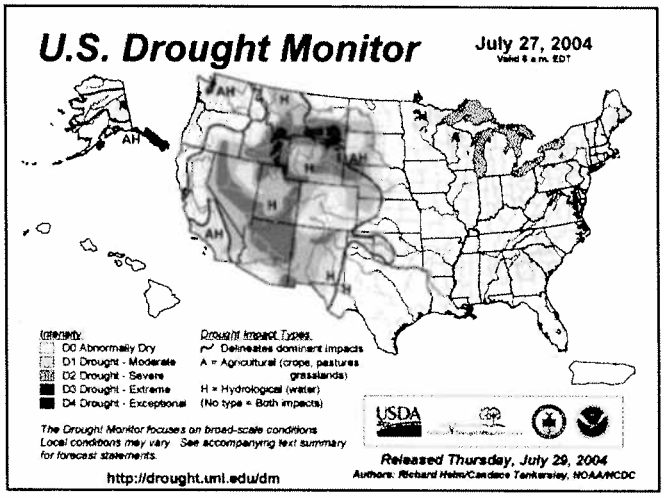
Eastern and Central Nevada were also warmer than normal and with little rainfall (0.30 monthly total in Elko) the average July temperature was 2.2°F above normal. In contrast to areas nearer Elko, Boies Ranch reported a monthly rainfall total of 2.57 inches.

Across the southern portion of the state July temperatures exceed the normal by as much as 4.0°F. Precipitation was also well below the normal expected for July. Sandy Valley reported a high temperature on July 22 of 115°F. Overton Beach also reported a high temperature of 115°F on July 13.

Eighteen stations recorded monthly extreme ranges (July extreme high temperature – July extreme low temperature) of 50°F. Two stations, Overton Beach and Sandy Valley had July average temperatures above 90°F.

DROUGHT OUTLOOK FOR JULY





US Seasonal Drought Outlook. From the Drought Monitor at the University of Nebraska-Lincoln.

Drought conditions persisted across the state during July. Only the extreme northern portions of the state showed modest improvement in drought stage as estimated by the Palmer Drought Intensity Index. One should interpret the Palmer results with the knowledge that the Palmer Index is not the most reliable drought indicator in mountain areas or in arid regions. This said, the state of Nevada is experiencing one of the most severe and persistent droughts in the past 50 years. The State Climate Office is in the process of assembling the Nevada Drought Review and Reporting Committee (NDRCC). This committee will analyze the state's drought condition regionally and use more detailed data to prepare reports for water management guidance.

AUGUST CONDITIONS

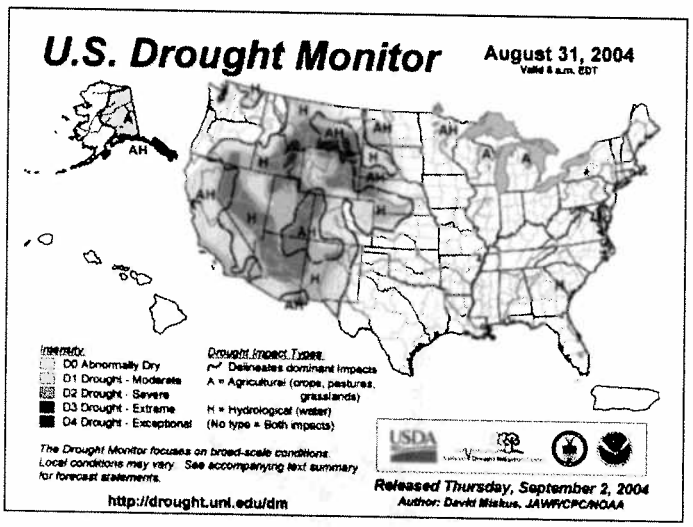
High temperatures were near normal for the month of August, and low temperatures were 8.4°F above normal, according to the Reno NWS.

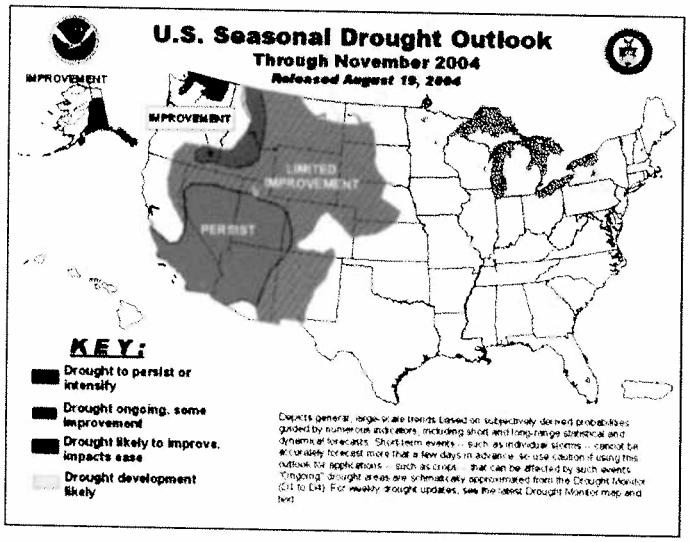
August saw a variety of weather patterns. A trough of low pressure off the west coast, at the beginning of August, brought a cool, dry, southwest flow to the Reno and surrounding areas. This pattern transitioned into higher temperatures as the "four corners high" pressure system built back in. This system began to move northward, allowing a southeast flow to develop that brought in monsoon moisture. Around the 22nd of the month, a strong trough of low pressure brought winds from the west and cooler temperatures. As an encore, high

pressure built back in, raising temperatures yet again (NWS, August E-5 Report)
August 15th showed up with a bang in the Las Vegas area as a flash flood occurred on Furnace Creek in Death Valley National Park, causing two deaths, the Las Vegas NWS reported. The floodwaters washed out sections of Highway 190 between Death Valley Junction and Furnace Creek.

Numerous thundershowers were reported over central and eastern Nevada in early to mid-August, leaving Elko with 300% of their normal August precipitation and Ely with 85%, while Winnemucca was left high and dry with less than normal precipitation.

DROUGHT OUTLOOK FOR AUGUST





Not much has changed with drought conditions in Nevada. We are still looking at conditions ranging from moderate in northeastern Nevada to the familiar extreme drought swath from the northwest to southeast. The monsoon rains have not been much of a relief. Pasture and range conditions have been rated at very poor to poor in 63% of Nevada (100% in California!).

The average reservoir capacity in Nevada was at 25%, the normal for this time of year being 64%. The stats from the Reno NWS Hydrologists regarding our reservoirs were as follows: Lake Tahoe lost 63140 acre-feet during August. This was, perhaps not surprisingly, the largest loss of all reservoirs in the area. The lake was 0.33" above the natural rim by the end of August, and is still expected to fall below the natural rim by the end of September. Boca lost over 1/3rd of its capacity because it was adding to the flow out of Lake Tahoe.

The outlook calls for more of the same, persistent drought conditions for most of Nevada in September and November, with only the most northern sections to possibly receive any relief at all.

FEATURE ARTICLE:

Fire Creates Its Own Weather

By: Rhett Milne, Warning Coordination Meteorologist, National Weather Service

Wildfires are not only influenced by weather, but they can actually create their own weather. Only when certain atmospheric conditions are met and the scale of a wildfire is large enough, will the fire create significant enough changes in weather conditions to be observed. The most notable and dramatic weather conditions caused by wildfires are the development of thunderstorms and an increase in winds.

The most easily observed weather phenomenon induced by wildfires is the development of pyrocumulus clouds. Pyrocumulus can be broken down to yield pyro, which means fire, and cumulus, which is associated with convection like cumulonimbus or thunderclouds. Two main thermodynamic processes occur during the combustion of fuel during wildfires. First, heat is produced which is forced to rise. Second, the combustion of the fuels turns liquid water in the fuel to water vapor. The heat from the fire rises with the evaporated water from the combustion

process. Under the right atmospheric conditions, thunderstorms will form due to the additional heat and moisture from the fire. Adjacent to the fire, the atmosphere will have an inversion strong enough to prevent thunderstorm development. The atmospheric is said to be "capped" under these stable conditions. Pyrocumulus clouds are able to form as the heat and moisture from the combustion process provide enough lift and energy to break through the inversion or "cap", allowing cumulus clouds to develop. Usually an impressive towering pyrocumulus cloud will result with virga and little rain produced. (see picture) The evaporation of the rain shaft can create downburst winds with speeds exceeding 40 mph and which can push the fire in all directions and help it to grow rapidly.

Pyrocumulus cloud forming at top of smoke column. Waterfall fire July 2004. Photo courtesy of Rhett Milne, National Weather Service

Fires that burn with extreme intensity can modify local wind patterns. To replace the very hot air that is forced to rise in the combustion process, air is drawn into the fire. Wind speeds of the air replacing the air that is forced to rise can be over 80 mph. An abundance of large fuels, such as timber, is necessary to allow the fire to burn at extreme temperatures to produce enough heat to rise at such a rapid rate that a rapid return flow of air is needed to replace it.

Smoke often leads to lower daytime high temperatures as solar radiation is prevented from heating the earth's surface due to scattering by smoke particles. Smoke trapped under morning inversions in steep topography sometimes prevents enough solar radiation from reaching the surface, thereby keeping temperatures from getting warm enough to break the inversion. Smoke has no impact on morning lows as longwave radiation is radiated out to space with no affect from the smoke particles.

SPOTLIGHT ON: *DAYTON*

Bill Hunt (Left) with Jeff Underwood, State Climatologist, inspecting weather monitoring equipment.

Bill Hunt has maintained his own weather station, recording and sending his weather information to the Dayton Courier, for quite some time now. Towards the end of 2000, former state climatologist, John James, saw Bill's tower as he was putting campaign signs up for his daughter Cathy James. Bill then got a visit from John, who asked if he would send his information to the State Climate office as well. Bill said yes and has been sending us his information since December of 2000.

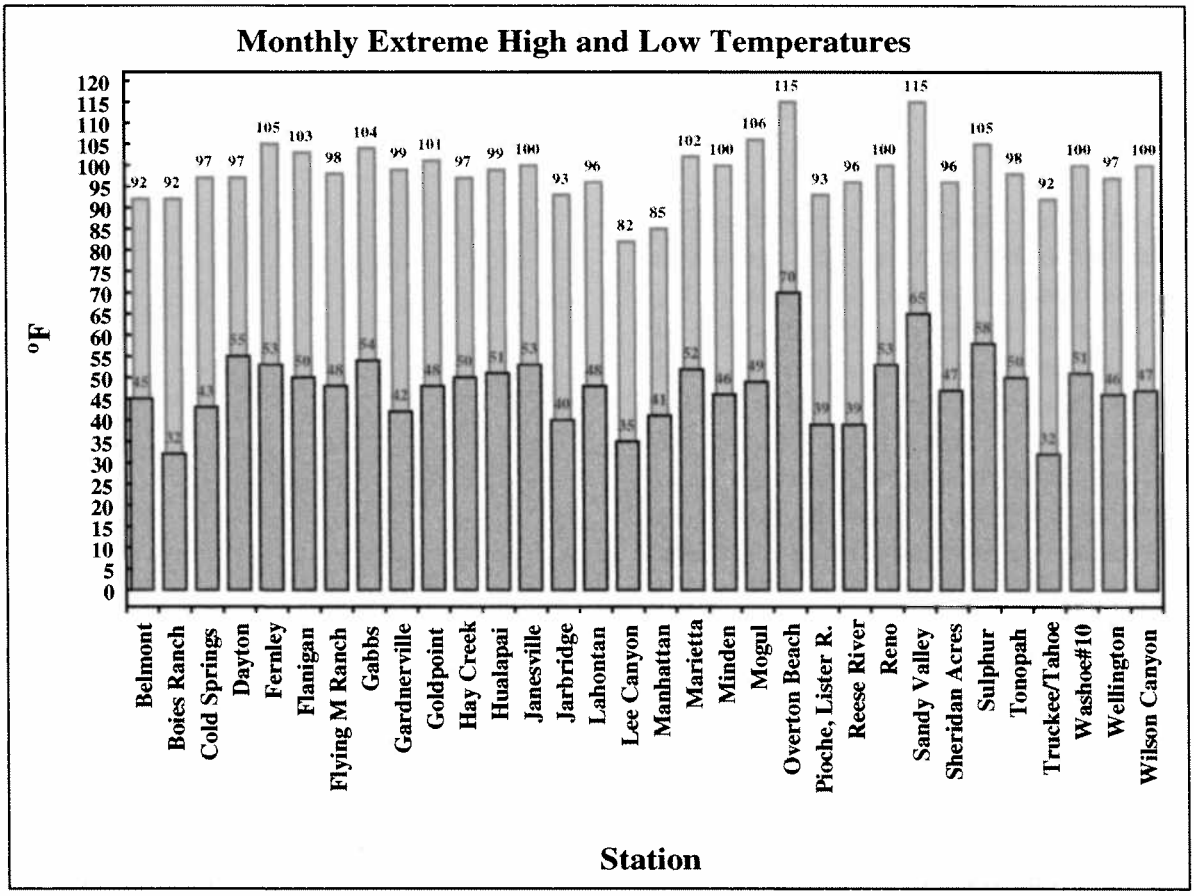
Bill has an anemometer to measure the wind speed and direction, recording temperature gauge and tipping bucket, and no less than 5 barometers (yes five), he likes to make sure his readings are as accurate as possible!

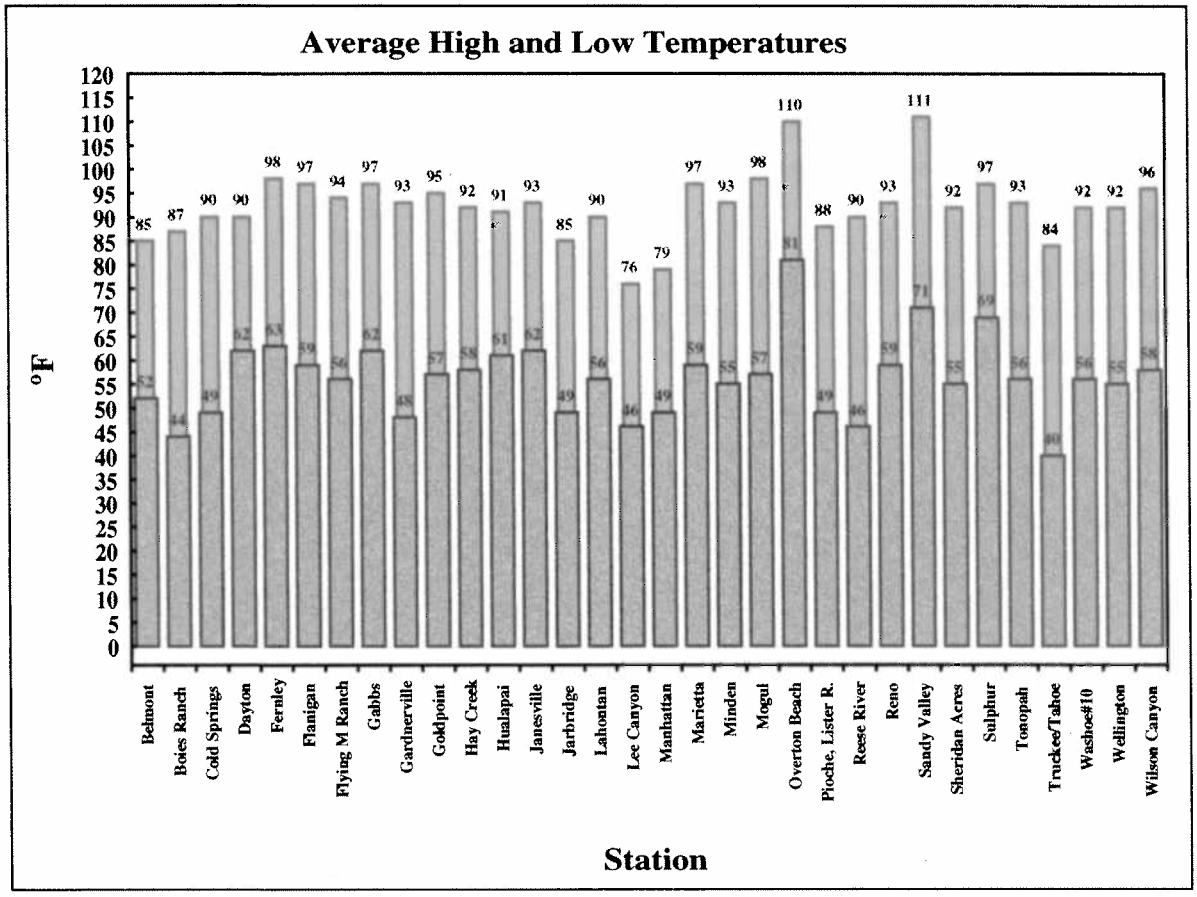
Bill was born in Grass Valley, CA, moved to San Rafael, enlisted in the Air Force in 1950 and was a Radio Tech. Supervisor during the Korean war. He worked as a "48 state" trucker for Mayflower, and as an electrical engineer for several companies. Bill is an avid ham radio operator, and talks to his brother every Sunday. This is not out of the ordinary but, it seems as though his radio is on the same frequency as the lamp over at the neighbors home. This would not normally be a problem; however, every time Bill turns on the radio, it also turns on the lamp at the neighbors house!

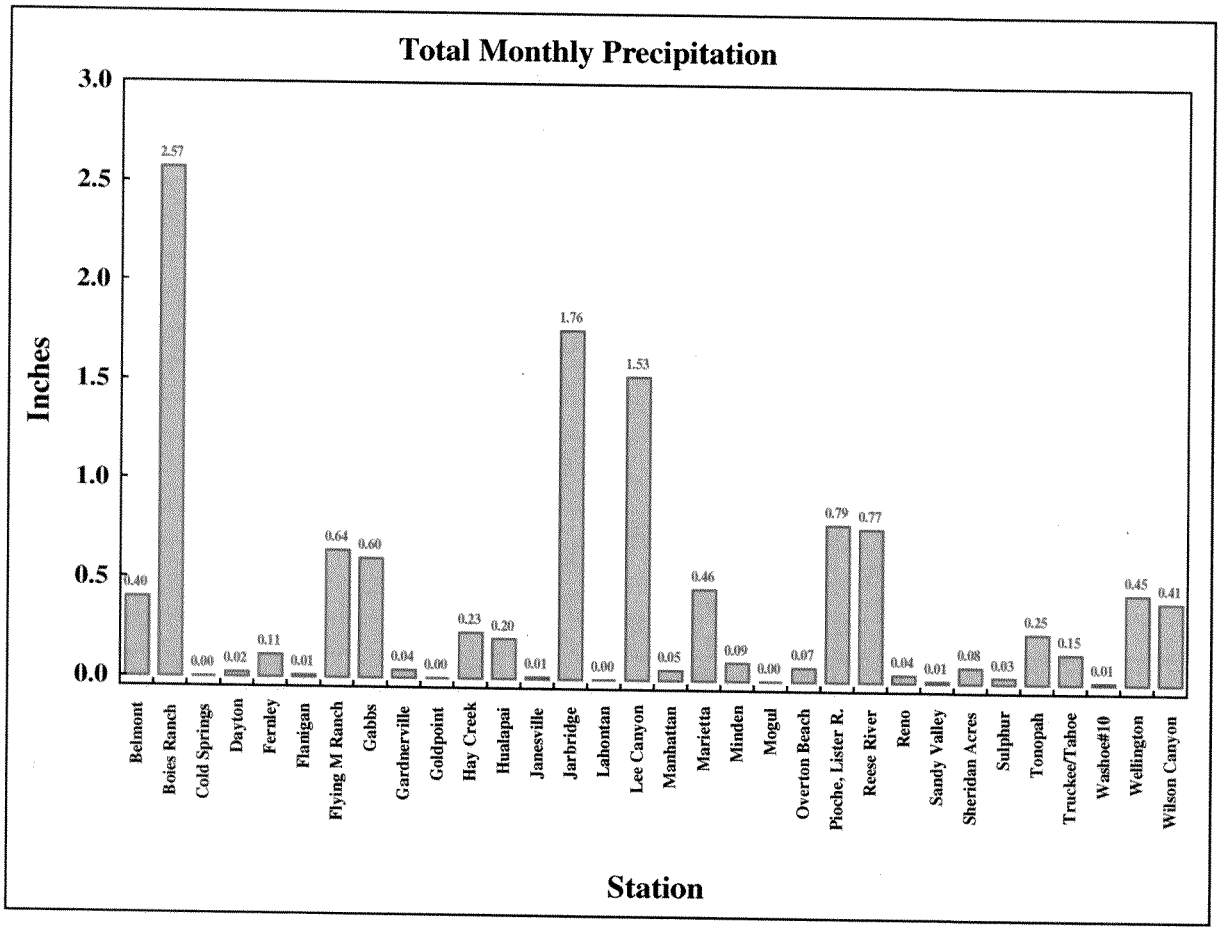
DO YOU HAVE INTERNET ACCESS?

We are still looking for observers who are willing to take on an additional task that would make their information even more useful. Those observers with internet access will be able to enter their data on-line at the end of the month. This will be **in addition** to mailing in the station forms every month. If you would like to be part of this project, please contact the office at 775.784.1723, or e-mail us at nclimate@scs.unr.edu, and we'll get you on-line!

Thank You, to our Pioche observer, Ruby Lister, and our Fernley observer, Martin Oberg, for being the first NSCO observers to take part in this database program. Also, thanks to Del Leatham, out at Overton, a NWS observer who also responded and is now entering his data for the database program.


Monthly Extreme High and Low Temperatures
°F
Station
Belmont
Boies Ranch
Cold Springs
Dayton
Fernley
Flanigan
Flying M Ranch
Gabbs
Gardnerville
Goldpoint
Hay Creek
Hualapai
Janesville
Jarbridge
Lahontan
Lee Canyon
Manhattan
Marietta
Minden
Mogul
Overton Beach
Pioche, Lister R.
Reese River
Reno
Sandy Valley
Sheridan Acres
Sulphur
Tonopah
Truckee/Tahoe
Washoe#10
Wellington
Wilson Canyon


Average High and Low Temperatures
°F
Station
Belmont
Boies Ranch
Cold Springs
Dayton
Fernley
Flanigan
Flying M Ranch
Gabbs
Gardnerville
Goldpoint
Hay Creek
Hualapai
Janesville
Jarbridge
Lahontan
Lee Canyon
Manhattan
Marietta
Minden
Mogul
Overton Beach
Pioche, Lister R.
Reese River
Reno
Sandy Valley
Sheridan Acres
Sulphur
Tonopah
Truckee/Tahoe
Washoe#10
Wellington
Wilson Canyon



SEPTEMBER										
Sunrise/Sunset Times										
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Sunrise	557	556	556	556	555	555	555	554	554	554
Sunset	1803	1803	1802	1802	1802	1801	1801	1801	1800	1800
Day	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Sunrise	553	553	553	552	552	551	551	551	550	550
Sunset	1800	1759	1759	1759	1758	1758	1758	1757	1757	1757
Day	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Sunrise	550	549	549	549	548	548	548	547	547	547
Sunset	1756	1756	1755	1755	1755	1754	1754	1754	1753	1753

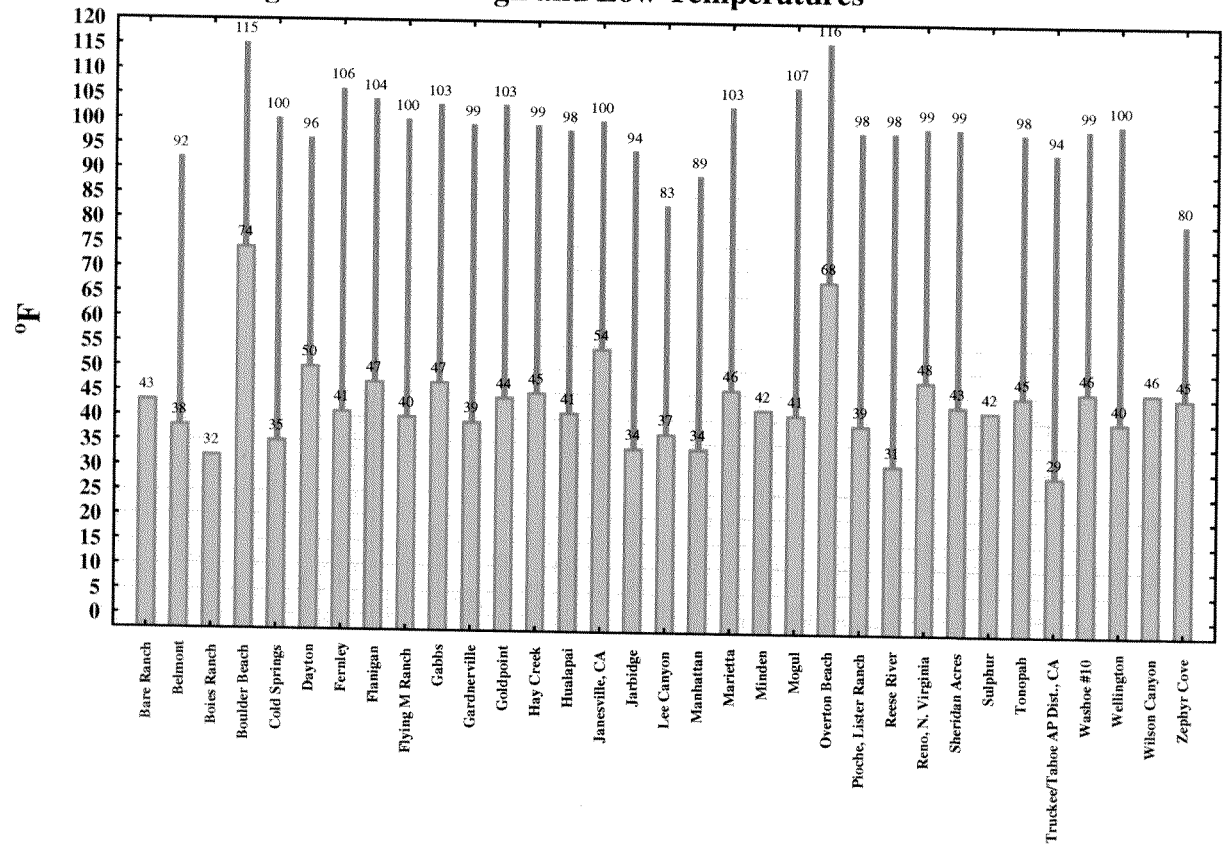
STATISTICS FOR THE MONTH OF JULY

	Extreme High	Day	Extreme Low	Day	Average High	Average Low	Average Monthly Temp	Precip	Snowfall
Bare Ranch	99	27th	47	8th	94	54	74	0.29	0.00
Belmont	92	21st	45	1,10th	85	52	68	0.40	0.00
Boies Ranch* (broken max)	92	30th	32	5,6th	87	44	56	2.57	0.00
Boulder Beach	115	22nd	76	2nd	108	85	96	0.35	0.00
Cold Springs	97	28th	43	1,8th	90	49	70	0.00	0.00
Dayton	97	25th	55	1,2,11th	90	62	76	0.02	0.00
Desert Valley (precip. only)								m	
Fernley	105	23,24th	53	10th	98	63	81	0.11	0.00
Flanigan	103	23,24th	50	11th	97	59	78	T	0.00
Flying M Ranch*	98	6,7,13,14,24,26th	48	1,10,11th	94	56	75	0.64	0.00
Gabbs	104	13th	54	1st	97	62	79	0.60	0.00
Gardnerville*	99	24th	42	1,11th	93	48	70	0.04	0.00
Goldpoint*	101	8th	48	1st	95	57	76	0.00	0.00
Hay Creek*	97	22-25th	50	10,11th	92	58	75	0.23	0.00
Honey Lake Wildlife Refuge	m	m	m	m	m	m	m	m	m
Hualapai	99	24th	51	11th	91	61	76	0.20	0.00
Jacks Valley	m	m	m	m	m	m	m	m	m
Janesville, CA	100	24,25th	53	10th	93	62	78	T	0.00
Jarbidge	93	15th	40	4th	85	49	67	1.76	0.00
Lahontan Nat'l Fish Hatchery*	96	23rd	48	1st	90	56	73	0.00	0.00
Lee Canyon	82	8th	35	1st	76	46	61	1.53	0.00
Manhattan	85	26,28,29th	41	3rd	79	49	64	0.05	0.00
Marietta	102	23,26th	52	11th	97	59	78	0.46	0.00
Minden	100	24,25th	46	1st	93	55	74	0.09	0.00
Mogul*	106	22nd	49	11th	98	57	78	0.00	0.00
Overton Beach*	115	13th	70	2nd	110	81	95	0.07	0.00
Pioche, Lister Ranch	93	7,30th	39	3rd	88	49	69	0.79	0.00
Reese River	96	13,14th	39	1,10th	90	46	68	0.77	0.00
Reno, N. Virginia	100	6th	53	2nd	93	59	76	0.04	0.00
Ruby Valley	m	m	m	m	m	m	m	m	m
Sandy Valley*	115	22nd	65	20th	111	71	91	T	0.00
Schurz (precip. only station)								0.48	
Sheridan Acres	96	24th	47	1st	92	55	73	0.08	0.00
Spanish Hills	m	m	m	m	m	m	m	m	m
Spanish Springs	m	m	m	m	m	m	m	0.00	m
Stillwater (Precip. only station)								0.03	
Sulphur	105	26th	58	12th	97	69	83	0.03	0.00
Tonopah	98	6,14th	50	2nd	93	56	74	0.25	0.00
Truckee/Tahoe AP Dist., CA	92	23rd	32	13,30,31st	84	40	62	0.15	0.00
Washoe #10*	100	6th	51	1,30th	92	56	74	T	0.00
Wellington	97	25th	46	1st	92	55	73	0.45	0.00
Wilson Canyon	100	6,22,24,25,28th	47	10th	96	58	77	0.41	0.00
Zephyr Cove	82	23rd	46	1st	75	54	64	.27	0.00

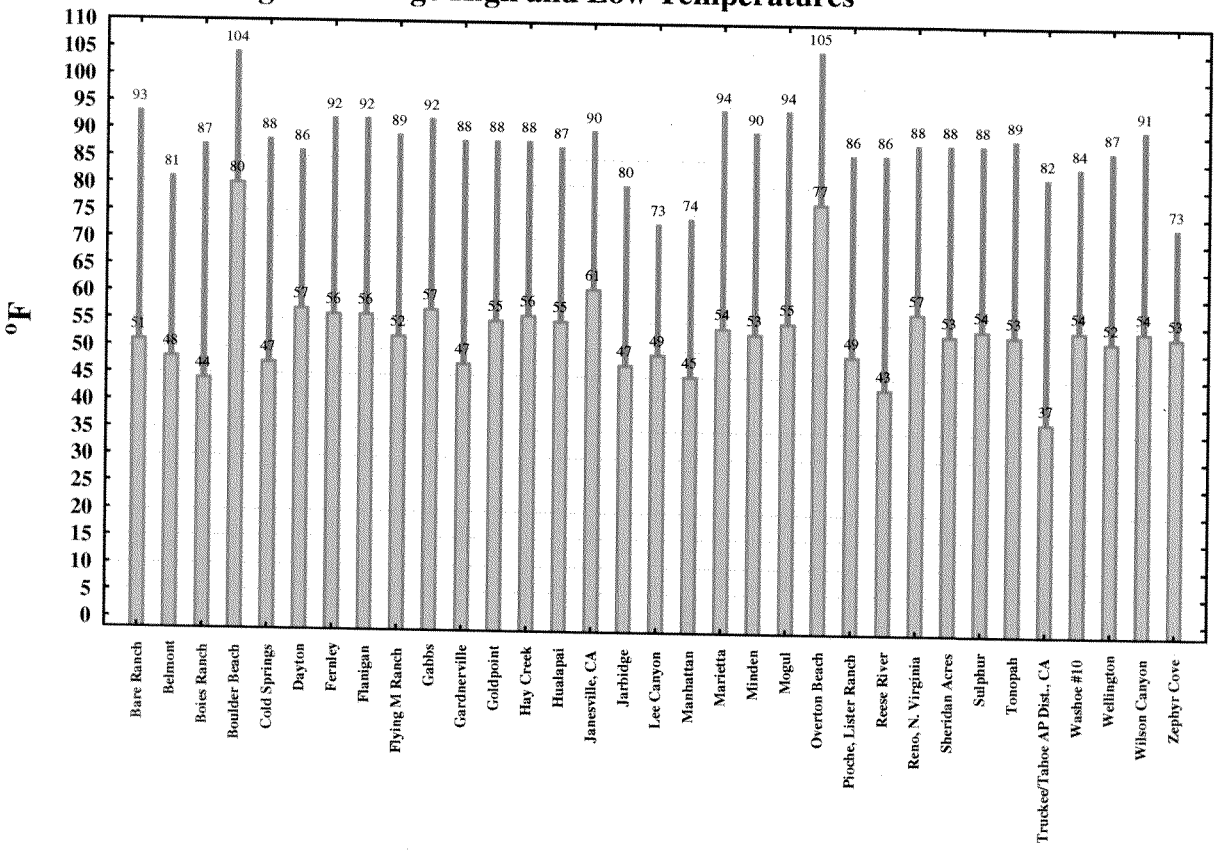
m - missing/late report

*Incomplete data

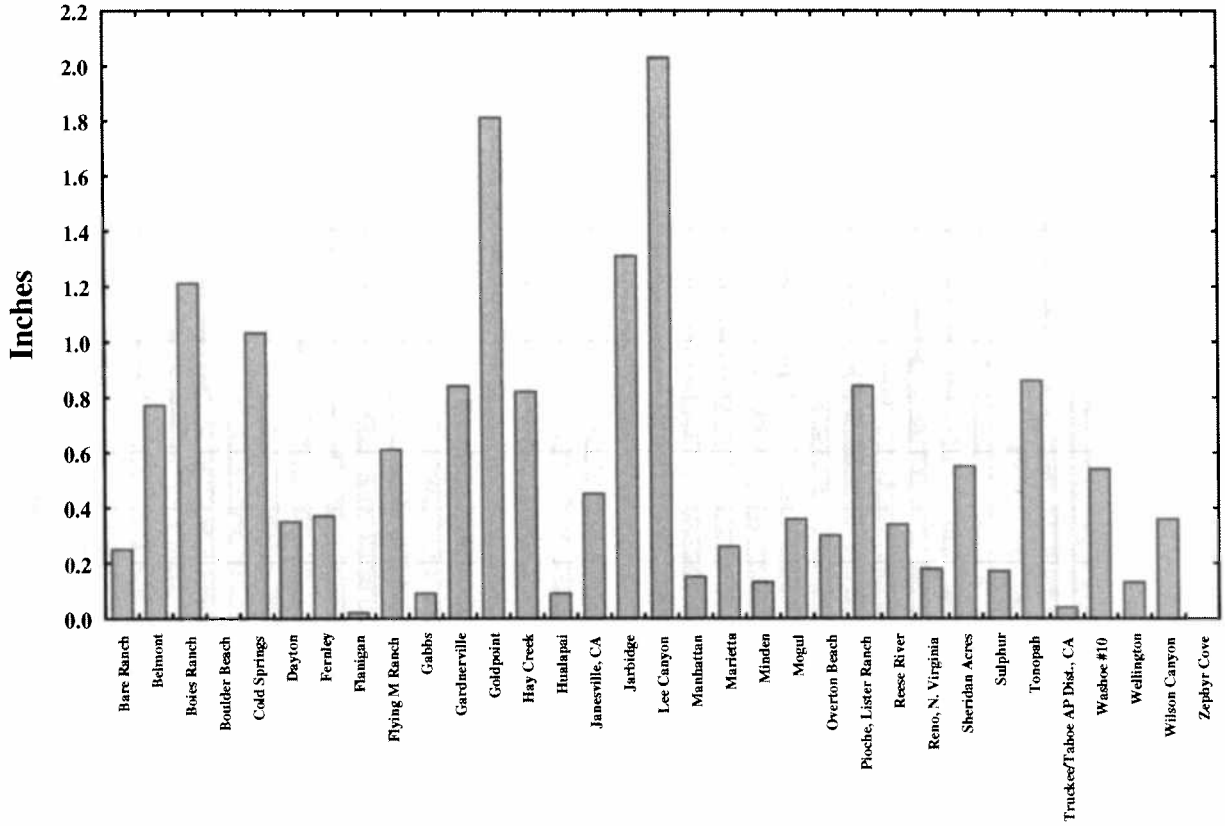
August Extreme High and Low Temperatures



August Average High and Low Temperatures



August Precipitation



OCTOBER										
Sunrise/Sunset Times										
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Sunrise	546	546	546	545	545	545	544	544	544	544
Sunset	1753	1752	1752	1752	1752	1751	1751	1751	1750	1750
Day	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Sunrise	543	543	543	543	542	542	542	542	542	541
Sunset	1750	1750	1749	1749	1749	1749	1749	1748	1748	1748
Day	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
Sunrise	541	541	541	541	541	541	540	540	540	540	540
Sunset	1748	1748	1748	1748	1747	1747	1747	1747	1747	1747	1747

STATISTICS FOR THE MONTH OF AUGUST

	Extreme High	Day	Extreme Low	Day	Average High	Average Low	Average Monthly Temp	Precip	Snowfall
Bare Ranch	101	12, 16th	43	28, 30th	93	51	72	0.25	
Belmont	92	11th	38	26th	81	48	64	0.77	
Boies Ranch	102	11th	32	26th	87	44	65	1.21	
Boulder Beach	115	12th	74	25, 29th	104	80	92	0.00	
Cold Springs	100	11th	35	7, 27th	88	47	67	1.03	T
Dayton	96	12th	50	27th	86	57	71	0.35	
Desert Valley (precip. only)	m	m	m	m	m	m	m	m	
Fernley	106	11th	41	27th	92	56	74	0.37	
Flanigan	104	11th	47	28th	92	56	74	0.02	
Flying M Ranch	100	11th	40	28th	89	52	71	0.61	
Gabbs	103	11th	47	27th	92	57	74	0.09	
Gardnerville	99	11th	39	3rd	88	47	68	0.84	
Goldpoint	103	12th	44	27th	88	55	74	1.81	
Hay Creek	99	9th	45	26th	88	56	71	0.82	
Honey Lake Wildlife Refuge	m	m	m	m	m	m	m	m	
Hualapai	98	12th	41	27th	87	55	71	0.09	
Jacks Valley	m	m	m	m	m	m	m	m	
Janesville, CA	100	12, 13th	54	27th	90	61	76	0.45	
Jarbidge	94	10, 12th	34	27th	80	47	64	1.31	
Lahontan Nat'l Fish Hatchery	m	m	m	m	m	m	m	m	
Lee Canyon	83	10th	37	24th	73	49	61	2.03	
Manhattan	89	11th	34	27th	74	45	60	0.15	
Marietta	103	11, 12th	46	27, 28th	94	54	74	0.26	
Minden	101	12th	42	27th	90	53	71	0.13	
Mogul	107	10th	41	27th	94	55	75	0.36	
Overton Beach	116	11th	68	29th	105	77	88	0.30	
Pioche, Lister Ranch	98	12th	39	28, 30th	86	49	67	0.84	
Reese River	98	12th	31	27, 28th	86	43	65	0.34	
Reno, N. Virginia	99	8th	48	28th	88	57	73	0.18	
Ruby Valley	m	m	m	m	m	m	m	m	
Sandy Valley*	m	m	m	m	m	m	m	m	
Schurz (precip. only station)	m	m	m	m	m	m	m	m	
Sheridan Acres	99	11th	43	7, 27th	88	53	70	0.55	
Spanish Hills	m	m	m	m	m	m	m	m	
Spanish Springs	m	m	m	m	m	m	m	m	
Stillwater (Precip. only station)								0.10	
Sulphur	102	9th	42	22, 25th	88	54	71	0.17	
Tonopah	98	11, 12th	45	27, 28th	89	53	71	0.86	
Truckee/Tahoe AP Dist., CA	94	10, 11th	29	3rd	82	37	58	0.04	
Washoe #10	99	11th	46	27th	84	54	71	0.54	
Wellington	100	11th	40	27th	87	52	70	0.13	
Wilson Canyon	102	11th	46	24, 26th	91	54	73	0.36	
Zephyr Cove	80	11, 12th	45	3rd	73	53	63	0.00	

* - Incomplete data

m - Missing data

Nevada State Climatologist
University of Nevada, Reno
116 Mackay Science Hall, ms-154
Reno, Nevada 89557

Nonprofit Org.
U.S. Postage
PAID
Reno, Nevada
Permit No. 26